THE SATH LAB

Northeastern Khoury College of Computer and Information Sciences

The Impact of Stress on Sleep: Capturing Multiday Patterns

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Let's Connect!

Motivation

- ❑ To evaluate the association between stress levels and sleep quality
- ❑ To contribute insights into managing stress and enhancing sleep quality among students

Methods

GLOBEM Study

GLOBEM study collected Fitbit wearable data and EMA survey responses from around 497 students over four years.

Categorize Perceived Stress Scores

Categorize weekly EMA PSS-4 stress scores as high (12-16 points), medium (6-11 points), and low (1-5 points).

Low

Medium

High

Statistical Analysis on Sleep Efficiency & Duration

Three Stress Group

ANOVA Analysis on Sleep...

Efficiency + Duration

Tukey's post hoc analysis

Results

- Statistically significant differences in sleep efficiency between low, medium, and high-stress days (p = 0.00), with significant variability in sleep efficiency ranges *for each participant* across these stress levels (p = 0.02)

classification labels	p-value for SE	p-value for ranges of SE
high vs low	P = 0.35	P = 0.09
high vs medium	P = 0.97	**P = 0.02**
low vs medium	**P = 0.00**	P = 0.35
low vs medium+high	**P = 0.00**	P = 0.34
low vs medium vs high	**P = 0.00**	**P = 0.02**

- Statistically significant differences in sleep duration between low, medium, and high-stress days (p=0.00). *For each participant*, there are also significant differences in the range of sleep duration (p=0.046), and in the mean sleep duration (p=0.02) on their low vs medium vs high-stress days

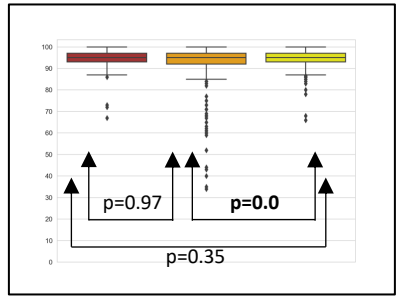
classification labels	p-value for SD	p-value for ranges of SD	P-value for mean of SD
high vs low	**P = 0.00**	P = 0.82	**P = 0.02**
high vs medium	**P = 0.02**	P = 0.27	P = 0.05
low vs medium	**P = 0.00**	P = 0.07	P = 0.58
low vs medium+high	**P = 0.00**	P = 0.05	P = 0.15
low vs medium vs high	**P = 0.00**	**p=0.046**	**P = 0.02**

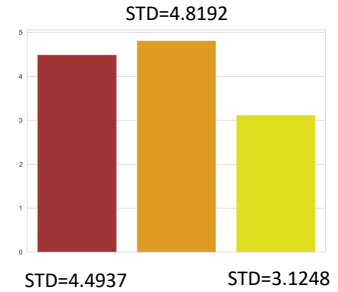
- Statistically significant differences in sleep efficiency ranges (p = 0.00), standard deviation (p = 0.02), and sleep duration ranges (p = 0.00) *in common participants* reporting distinct stress

Key Takeaways

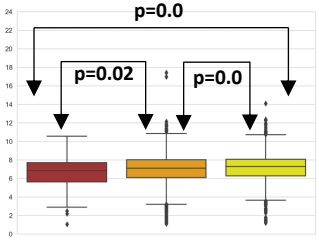
- ❑ Stress impacts the **range and standard deviation of sleep efficiency** as well as the **range of sleep duration**.
- ❑ Days with higher stress exhibited greater variations in sleep efficiency and duration compared to days with lower stress.

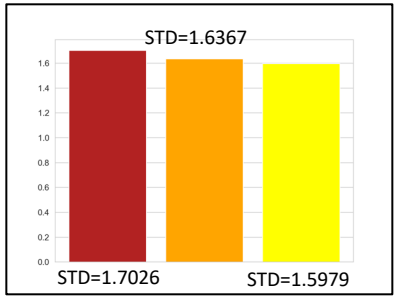
sleep efficiency





sleep duration





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